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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/854,611	05/14/2001	M. James Grieve	DP-302895	4829

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EXAMINER

WINTER, GENTLE E

ART UNIT

PAPER NUMBER

1746

DATE MAILED: 07/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/854,611

Applicant(s)

GRIEVE ET AL.

Examiner

Gentle E Winter

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 18, 19 and 26-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 18, 19 and 26-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7 May 2004 has been entered.

Response to Remarks

1. In the Response to the last Office action the claims were amended, and it was argued that weight should not be accorded to the preamble.

2. The response directed to claim 1 is drawn to the claim as it now appears, and not as rejected. The claim is amended to recite that the feedstock to the distillation column must consist essentially of Diesel fuel. Applicant has credibly argued that the HSW reference discloses supplying a cruder cut to the column. The rejection of claims 1 and 2, rejected under 35 U.S.C. § 102(b), is withdrawn.

3. The Response traversed the 35 U.S.C. § 103 rejection of claims 18, 19, and 3. The rejection relied on HSW and United States Patent No. 4,522,894 to Hwang et al. The rejection has been withdrawn with respect to claim 1, from which claims 3, 18, and 19 depend. The rejection, as it existed, is no longer proper and is withdrawn based on the amendment to claim 1.

Art Unit: 1746

4. The Response also traversed the rejection of claims 1-3, 18, 19, and 26-33 under 35 U.S.C. § 103. The response argues that the Office action failed to address the limitation: “fractional distillation device is in fluid communication with a reformer.” The rejection was an Obviousness rejection. The limitation was addressed, however the claim amendments and remarks have distinguished the claim. The record is now clear that the fluid communication is critical to the invention.

Claim Rejections - 35 USC § 101 and § 112

5. 35 U.S.C. § 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

And

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 35, 36, 38, and 39 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966). See also MPEP 2173.05(q), for a discussion of use claims.

Art Unit: 1746

8. Claims 35, 36, 38 and 39 provide for the use of thermal energy, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

9. Claims 26 and 33 are also use claims, but are considered sufficiently clear to allow for effective evaluation. The verb “utilizing” has been construed as being synonymous with “providing” or “supplying”. Applicant is requested to clarify the claim language.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 26, 28, 33, 34, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over the “How Oil Refining Works” (HSW) and US 20020029881 to de Rouffignac. HSW reads on claim 28 in the following manner. Crude oil, including a fraction that boils in the 250-350C range (482-662F) range is supplied to a column. The carbon content is 12 or more carbon atoms per molecule. The recited ranges are commonly associated with diesel fuel. See page 3 of HSW. The indicated range, hereinafter diesel fuel, is in portions comes off with kerosene and lubricating oil. See page 3 of the HSW reference disclosing the overlapping fractions. The reformer, illustrated at page of 8 the HSW reference, is disclosed to produce a reformat.

Art Unit: 1746

12. The HSW reference teaches the claimed invention except for the production of syngas (H₂ and CO). de Rouffignac teaches that it is known to reform hydrocarbons in the presence of steam to produce CO and H₂ as major products. See [0289]. It would have been obvious to one having ordinary skill in the art at the time the invention was made to extract syngas from a petroleum feedstock as taught by de Rouffignac, since de Rouffignac states at page 2, paragraph 16 that such the production of syngas would allow H₂ and CO to be sent to fuel cells to generate electricity.

13. Claims 1, 3, 18, 19, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over HSW in view of United States Patent No. 5,686,196 to Singh.

14. HSW teaches providing a crude hydrocarbon to a distillation column to separate the crude hydrocarbon into lighter and heavier component parts (page 4 HSW), and optimizing the production of certain components based on demand. Page 5 of HSW discloses:

Very few of the components come out of the fractional distillation column ready for market. *** For example, only 40% of distilled crude oil is gasoline; however, gasoline is one of the major products made by oil companies. Rather than continually distilling large quantities of crude oil, oil companies chemically process some other fractions from the distillation column to make gasoline; this processing increases the yield of gasoline from each barrel of crude oil.

15. HSW further discloses that reformers are used to assist in the processing of the distilled hydrocarbons, specifically in the production of hydrogen, as a byproduct of molecular unification. See page 7 of HSW. HSW further discloses, that lighter fractions from the distillation column are sent to the reformer, for molecular unification and associated production of hydrogen. (Page 7). HSW fails to explicitly teach “providing a fluid consisting essentially of

Art Unit: 1746

diesel fuel”. Singh explicitly teaches the missing element (providing diesel fuel) and provides the motivation for making the recited combination. Singh discloses a system that provides the “capability of operating a solid oxide fuel cell generator on commercial and military grade diesel fuels without the requirement of an external source of high pressure hydrogen”. See Singh column 4, line 63 *et seq.* One of ordinary skill in the art would have been motivated to select a fuel that is readily available and ideally has a reasonably low flashpoint.

16. As to claims 3, 18, 27, 28, 30, and 33 Singh teaches a method for reforming a diesel fuel component; including the steps of supplying diesel fuel to a hydrodesulfurizer (column 3, line 18 *et seq.*) that is in fluid communication with a steam reformer (column 3, line 25 *et seq.*) that produces a product that comprises synthesis gas (column 3, line 25 *et seq.* see especially line 34.). A portion of the reformat is fed to a solid oxide fuel cell (see figure 1 and relevant associated text).

17. Claims 2, 19, 29, 31, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over HSW in view of United States Patent No. 5,686,196 to Singh and further in view of United States Patent No. 6,572,837 to Holland et al (Holland).

18. HSW fails to explicitly teach burning the heavy fuel stream. However, the reformation process is endothermic, meaning heat would need to be supplied. (See Holland column 1, line 47). One of ordinary skill in the relevant art would recognize that a source of heat would be required to operate the endothermic reformer. One of ordinary skill would have been motivated

Art Unit: 1746

to use the heavy fuel residue already present, thereby eliminating the need for disposing of the hydrogen-poor/carbon-rich fuel component and further, using the heavy component eliminates the need for carrying and storing a second fuel for the reformer.

19. Claim 1-3, 18 19 27 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,217,748 to Hatanka et al. (Hatanka) in view of United States Patent No. 6,572,837 to Holland et al. (Holland). Hatanka teaches supplying diesel to a distillation device and separating the diesel feedstock into light fraction and heavy fraction by distillation. See e.g. Hatanka at column 10, line 30 *et seq.*

20. Each and every limitation of claim 1 is identically disclosed in Hatanka, as set forth above, except Hatanka fails to explicitly disclose reforming the light stream. Holland discloses a fuel processing method that includes converting a feed stream to a first reformat stream comprising hydrogen. Column 3, line 55 *et seq.* Holland provides the explicit motivation for making the claimed combination. Namely, Holland states at column 7, line 37 *et seq.*, that such a modification generates a stream of hydrogen that is used in a fuel cell.

21. As to claims 2 and 19 disclosing that the heavy fraction is burned, since a steam reformer is an endothermic system (Holland column 1, line 47), an external source of heat is required. One of ordinary skill in the relevant art would have been motivated to find a way of using existing fuel to provide the heat to drive the endothermic steam reformer (which produces hydrogen). Here, one of ordinary skill would have been motivated to use the heavier stream of

Art Unit: 1746

Hatanka (which is poorer in hydrogen) to provide the requisite heat for the endothermic reactor, thus driving the endothermic steam reforming reaction (I). Holland Column 2, line 18 et seq.

22. With respect to claims 3 and 27 a steam reformer is further disclosed in Holland, column 4, line 15 et seq see especially line 25. One of ordinary skill in the relevant art would have been motivated to use a system that includes a steam reformer for the reason set forth at column 1, line 32 et seq in Holland. Namely, because steam reformers convert hydrocarbons to reformat gas streams that contain hydrogen and carbon monoxide (CO can readily be converted to hydrogen using the water gas shift reaction. Column 2, line 30 et seq.) In practice the hydrocarbon feedstock and steam are reacted in reactors filled with catalyst whereby hydrogen (H₂) *** and carbon monoxide (CO) (synthesis gas) are produced.

23. As to claim 18, disclosing that the diesel fuel includes hydrotreated diesel fuel, Holland discloses that additional processing steps are generally performed to reduce the sulfur and/or CO content of the fuel gas to meet fuel cell requirements. Column 2, line 27 et seq. One of ordinary skill in the relevant would have been motivated to hydrotreat the diesel to reduce the sulfur concentration in an effort to reduce the likelihood that the fuel cell will be poisoned, thereby prolonging the life of the fuel cell, and allowing for the continued delivery of electricity.

24. As to claim 34 applicant has used the modifier “about”. Since it is not clear what value should be ascribed to the modifier “about” and since diesel usually is considered to have a range of 12-20 the diesel in Holland is deemed to meet the claim limitations.

Pertinent Prior Art

25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Search Report provided with paper 021704 includes two "X" references. The first is GB 1 059 957 discloses steam reformation of light hydrocarbons. The reference fails to disclose fractional distillation. The reference is considered cumulative with many of the references of record. The conversion of light hydrocarbons into syngas, is well represented in the applied references.

26. With respect to GB 719 003 A, also an X references, this document is considered to be substantively cumulative with HSW reference. Specifically, like the HSW reference, this reference (GB 719 003) fails to specifically disclose "consisting essentially of" diesel fuel.

27. Of note is WO 01/25140, an "A" reference, specifically discloses reforming diesel fuel, see page 2, line 26 *et seq.* The reference does not disclose distillation.

Conclusion

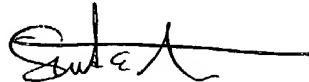
28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gentle E Winter whose telephone number is 571-272-1310. The examiner can normally be reached on Monday through Friday 7AM-4PM.

29. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1746

30. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gentle E. Winter
Examiner
Art Unit 1746

A handwritten signature in black ink, appearing to read "Gentle E. Winter", with a long horizontal stroke extending to the right.

July 21, 2004